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(54) Title: METHOD FOR THE PRODUCTION OF A FOOD PACKAGE		
(57) Abstract	<p>A food package comprises a shaped, preferably deep-drawn first film (1) which includes at least one compartment (1') for a food product contained in the package. It further comprises a second film (2) serving as a cover film, said films (1 and 2) being joined together for providing a package space (4) for a food product (E), said space being sealed with a flange joint (3), and a supporting structure (5) inside which said first film (1) is substantially fitted and to which is attached a combination formed by first (1) and second (2) films.</p>	

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Method for the production of a food package

The present invention relates to a method for the production of a food package as set forth in the preamble of claim 1.

A food package produced by the application of a method of the invention is intended to be used especially as a package for so-called processed foods. An increasing tendency in modern foodstuffs industry is to supply the consumers with foodstuffs processed as far as possible. Thus, the requirements set for a food package are essential. Critical factors include food package manufacturing technique, package properties and simplicity in use.

Generally speaking, the following qualities are required of a food package, especially a food package containing processed food: cold resistance (deep-freezing quality), heat resistance (conventional oven, microwave oven), storage and handling properties, mechanical strength and qualities having to do with actual serving and eating. The requirements set for materials used especially as plastic films or sheets in food packages include e.g. film joining properties (e.g. hot-sealing properties), possibility of film shaping (e.g. deep drawing) etc. The materials used in food packages in addition to plastic films should be capable of providing a necessary mechanical strength. Furthermore, the package space confined by plastic films should be capable of withstanding treatments improving the shelf life of a foodstuff, such as e.g. protective gas filling, pasteurization or sterilization.

Publication WO 86/04880 discloses a package, comprising

a combination of a first film and a supporting structure joined together by a deep-drawing technique as well as a second film attached to the combination and serving as a cover. The supporting structure is not an independently shape-retaining, sufficiently rigid package space forming structure, but said first film joins the supporting structure wall portions and floor together for an assembly in the shape of a package space during the building of such combination. The second film is attached to the combination after it has been assembled.

An object of this invention is to introduce a method for the production of a food package meeting the above requirements, mainly characterized by the following steps:

- A) shaping a first film,
- B) placing a food product inside a compartment formed by the first film,
- C) sealing the compartment with a second film or the like serving as a cover film,
- D) fabricating a supporting structure comprising a shaped portion,
- E) placing a combination formed by the first and second films in contact with the supporting structure in a manner that the first film fits into the shaped portion of said supporting structure, and
- F) joining the combination and the supporting structure together.

The above steps make it possible to apply a preferred manufacturing technique by using prior known deep-drawing packers as well as provide a highly practical pack-

age.

According to one preferred application of the method, the package space of a combination formed by the first and second films can be subjected to at least one treatment, such as a protective gas treatment, pasteurization or sterilization prior to joining the combination to a supporting structure, whereby the supporting structure is not damaged during such treatment.

It is preferred that a supporting structure as well as a combination formed by the first and second films be joined together at an edge joint between said films. In addition, it is possible to join the supporting structure and the first film together by using dot-shaped and/or line-shaped junctions. Certain functional advantages are gained by these solutions.

Other characterizing features of the invention are set forth in the annexed subclaims.

The invention is described in more detail in the following specification, wherein reference is made to the embodiments shown in the accompanying drawings. In the drawings

fig. 1 is a so-called exploded view of one embodiment of a package of the invention,

fig. 2 is a cross-sectional view of the package shown in fig. 1 including further two partial enlargements of the package walls,

fig. 3 is a perspective view of an embodiment of a package of the invention, whose package space

comprises two compartments for different food products, and

fig. 4 is a diagrammatic sketch of a packing sequence.

Referring to fig. 1, reference numeral 1 designates a first film, made of a plastics material. This film is shaped, preferably deep drawn, so as to include at least one compartment 1' for a food product contained in the package. The shaped portion, its flanges are provided with a lap 1" as part of the first film. The first film 1 is manufactured and shaped during the first step of food package production. The second step comprises placing a food product E inside compartment 1'. In the third step, compartment 1' is sealed with a second film 2, serving as a cover film and made of a plastics material, or the sealing is effected with some other cover material. The sealing is effected between the edge portion 2" of second film 2 and the lap 1" of first film 1 for providing an edge joint, shown particularly in figs. 2 and 3. The central portion 2' of second film 2 can be flat, as in fig. 1, or it can be more or less shaped e.g. by deep drawing the same way as first film 1.

When joined together, said first 1 and second 2 films provide a combination in the form of a sealed elastic package whose interior comprises a package space 4 for a food product/food products E.

At this stage of production, if necessary in terms of the shelf life or preparation of a food product, this combination is preferably subjected to various types of treatments, such as protective-gas filling. One possibility here is e.g. vacuum filling technique.

This is possible for the reason that, at this stage, the combination can be deflated since the plastic films are resilient and possible deformations at this time bear no significance as to the final qualities of a package. Thus, the air can be exhausted from package space 4 and vacuum filling technique can be applied to fill said package space 4 with an inert protective gas. Combination 1, 2 returns to its original shape after the vacuum filling. Similar treatments include pasteurization and sterilization for improving the shelf life of a food product contained in package space 4. These treatments can be preferably effected just at this stage as combination 1, 2 is still in a resilient condition and the treatment is not restricted by the properties of a supporting structure, nor is the supporting structure damaged as a result of such treatment.

Following the above treatments, the combination in the form of an elastic package consisting of first 1 and second 2 films is placed inside the shaped portion 5' of a supporting structure 5 in a manner that the shaped first film portion fits into the corresponding portion of supporting structure 5. The shaped supporting structure portion 5' and said shaped compartment 1' of first film 1 are substantially of equal size, so the lap 1" of film 1 lays itself upon a shoulder, preferably a flange 5" surrounding the shaped portion of supporting structure 5. At this time, there is effected the joining between the combination formed by first 1 and second 2 films and supporting structure (joint 6, especially in fig. 2). Dot-shaped and/or line-shaped junctions 7 can be provided on the shaped supporting structure portion 5' between supporting structure 5 and first film 1.

Depending on shelf-life requirements and ultimate use and sealing, said films 1 and 2 can be optionally made of various materials. Particularly, if hot sealing is used for a joint 3, the films will be selected in a manner that films 1 and 2 join together and film 1 joins also to the supporting structure. If one of the above joints is effected by gluing, there will be more possibilities of selecting the films.

A bottom corner of the food package is shown enlarged in detail B of fig. 2. This illustrates dot-shaped or line-shaped junctions 7 between supporting structure 5 and first film 1 for effecting a possibly necessary attachment of first film 1 to the shaped portion 5' of supporting structure 5.

The supporting structure 5 can be fabricated by using cardboard, paperboard or plastics. The supporting structure can be a pre-made cardboard box or tray whose material comprises cardboard or paperboard, possibly coated with a hot-sealing layer of plastics (PET). The supporting structure can also be obtained by using an erectable package which is assembled to its final form prior to fitting a combination formed by films 1 and 2 inside the supporting structure. The assembly is effected by applying a gluing, clamp-hook or a like technique from cardboard or paperboard. The supporting structure can also be shaped by press moulding or deep drawing. The supporting structure material can be selected and its shaping effected according to the intended use of a food package. An essential feature of supporting structure 5 is to provide a necessary mechanical protection for a possibly processed food product placed inside the combination formed by films 1 and 2 and to allow the utilization of such support-

ing structure at the time when a food package is used e.g. as a plate or other base. The supporting structure need not possess liquid or gas tightness qualities.

As particularly shown in fig. 3, film 2 can be provided with a tear-off indication 8, whereat the removal of a cover-film serving second film 2 can be initiated for consuming the food products. Particularly in the embodiment shown in fig. 3, a combination formed by films 1 and 2 is divided into two compartments by means of a partition 9. Thus, one and the same food package can be furnished with different types of food products, e.g. a ready-made meal. In the case shown in fig. 3, the shaped portion of film 1 includes a folding lap, extending from the floor up to cover film 2 and joined thereto, said partition 9 being fitted therebetween. It is obvious that the package can include even more compartments whenever necessary.

In package manufacturing technique, it is possible to apply methods known from plastic films handling technique, whereby the shaping of a first film especially by deep drawing can be effected on a wide web of plastic film in a manner that a plurality of shaping procedures are simultaneously effected in the lateral direction of a web followed by placing the food products inside the above-mentioned shaped portions. This is followed by laying a cover film web matching the width of said film web upon the first film web, a possible protective-gas filling and forming the above-mentioned joints 3. Thereafter, the parallel, still unified combinations are forwarded to possible pasteurization and sterilization stages. This is followed by fitting the combinations inside the supporting structures and finished food packages are separated from each other.

to form either individual packages or groups of packages.

Preferable applications may include various pies, such as meat and Karelian pies, pizzas, ready-made food portions, processed baking dishes, soups etc., either deep-frozen or fresh. Food products can be pre-cooked or uncooked as the case may be.

One example of a preferred embodiment of films 1 and 2 especially for food packages intended for microwave ovens and/or conventional ovens can be the following combined film structure. As a hot-sealing (especially for joint 3) layer, said films 1 and 2 can be provided with amorphous, crystallizable polyester (PET). Since this type of plastic is well sealable with heat and deep drawable, it will soften and go shapeless by itself at a temperature of 100°C to 130°C. When the above film is combined with another film whose softening point is above 150°C (e.g. PP, orientated PET, PA etc.), the result will be a composite film capable of resisting high temperatures (150°C to 250°C) since during the thermal treatment of a food package the polyester crystallizes on the surface of a carrier layer as a high temperature resistant film. The above layers can be joined together by laminating, co-extruding or coating. The surfaces of carrier films can be treated with a heat-resistant lacquer, if necessary.

Fig. 4 illustrates schematically the method sequence, the reference numerals corresponding to those used in figs. 1 to 3.

Claims

1. A method for the production of a food package, said food package comprising:

- a shaped, preferably deep-drawn first film (1) including at least one compartment (1') for a food product contained in the package,
- a second film (2) serving as a cover film, said films (1 and 2) being joined together for providing a package space (4) for a food product (E), said space being sealed with a flange joint (3), and
- a supporting structure (5) inside which said first film (1) is substantially fitted and to which is attached a combination formed by first (1) and second (2) films,

characterized by the following steps:

- A) shaping a first film (1),
- B) placing a food product (E) inside a compartment (1') formed by first film (1),
- C) sealing compartment (1') with a second film (2) or the like serving as a cover film,
- D) fabricating a supporting structure (5) comprising a shaped portion (5'),
- E) placing a combination formed by first and second films (1, 2) in contact with the supporting structure in a manner that the first film fits into shaped portion (5') of supporting structure (5), and
- F) joining combination (1, 2) and supporting

structure (5) together.

2. A method as set forth in claim 1, characterized in that said package space (4) built by combination (1, 2) formed by the first and second films is subjected to at least one treatment, such as a protective-gas treatment, pasteurization and/or sterilization prior to attaching said combination (1, 2) to the supporting structure.

3. A method as set forth in claim 1, characterized in that said supporting structure (5) and the combination formed by first and second films (1 and 2) are joined together at least at a flange joint (3) between said films (1 and 2).

4. A method as set forth in claims 1 and 3, characterized in that said supporting structure (5) and the first film are joined together also by using dot-shaped and/or line-shaped junctions (7) provided on said shaped portion (5') of the supporting structure.

5. A method as set forth in claim 1, characterized in that the films forming said combination (1, 2) are worked into a composite film comprising at least two layers, whereof the layers set against each other at joint (3) are made of a hot-sealing material which, after its crystallization, withstands a temperature of over 200°C and whereof the upper layer forms a carrier layer whose qualities are so selected that its softening point is higher than what the hot-sealing layer requires for its crystallization.

6. A method as set forth in claim 1, characterized in that said supporting structure (5) is made of heat-resistant cardboard, paperboard or plastics and that the supporting structure is preferably erected by using a gluing, clamp-hook or a like assembling method.

7. A method as set forth in claim 1, characterized in that the supporting structure is manufactured by press moulding or deep drawing by using e.g. heat-resistant cardboard, paperboard or plastics.

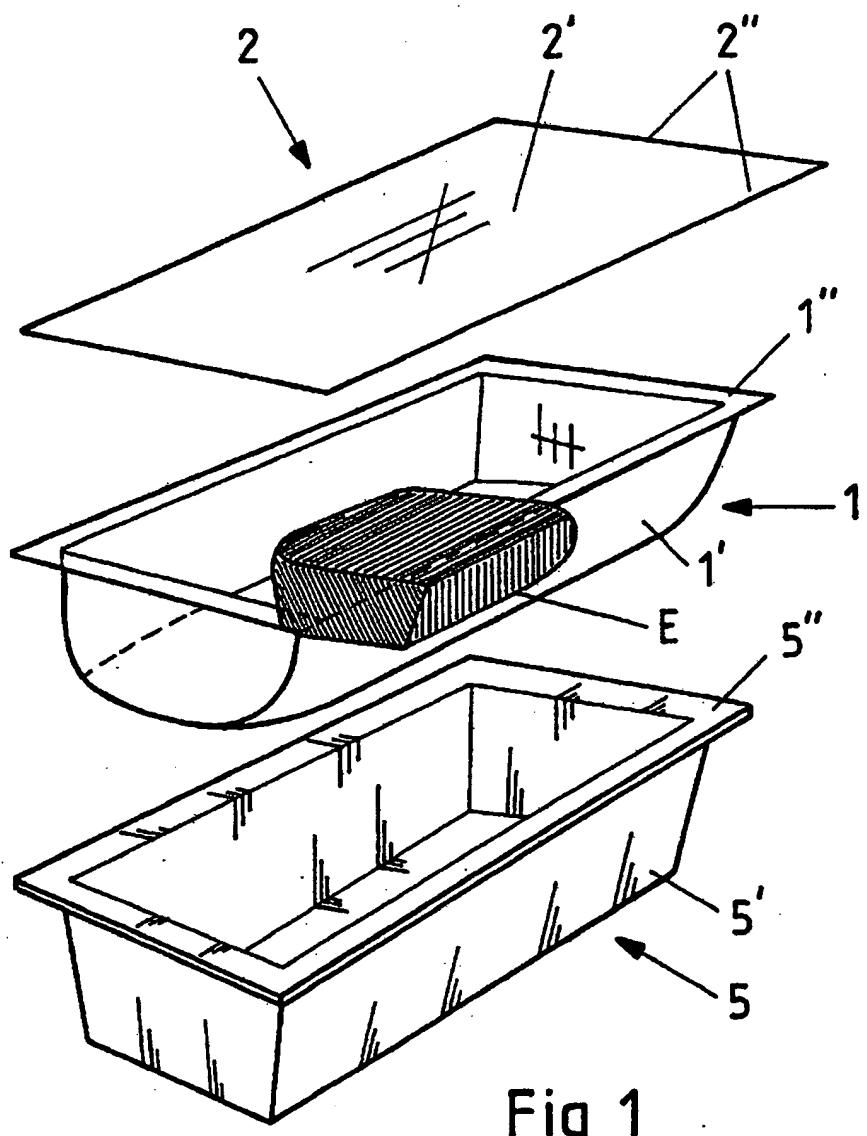


Fig 1

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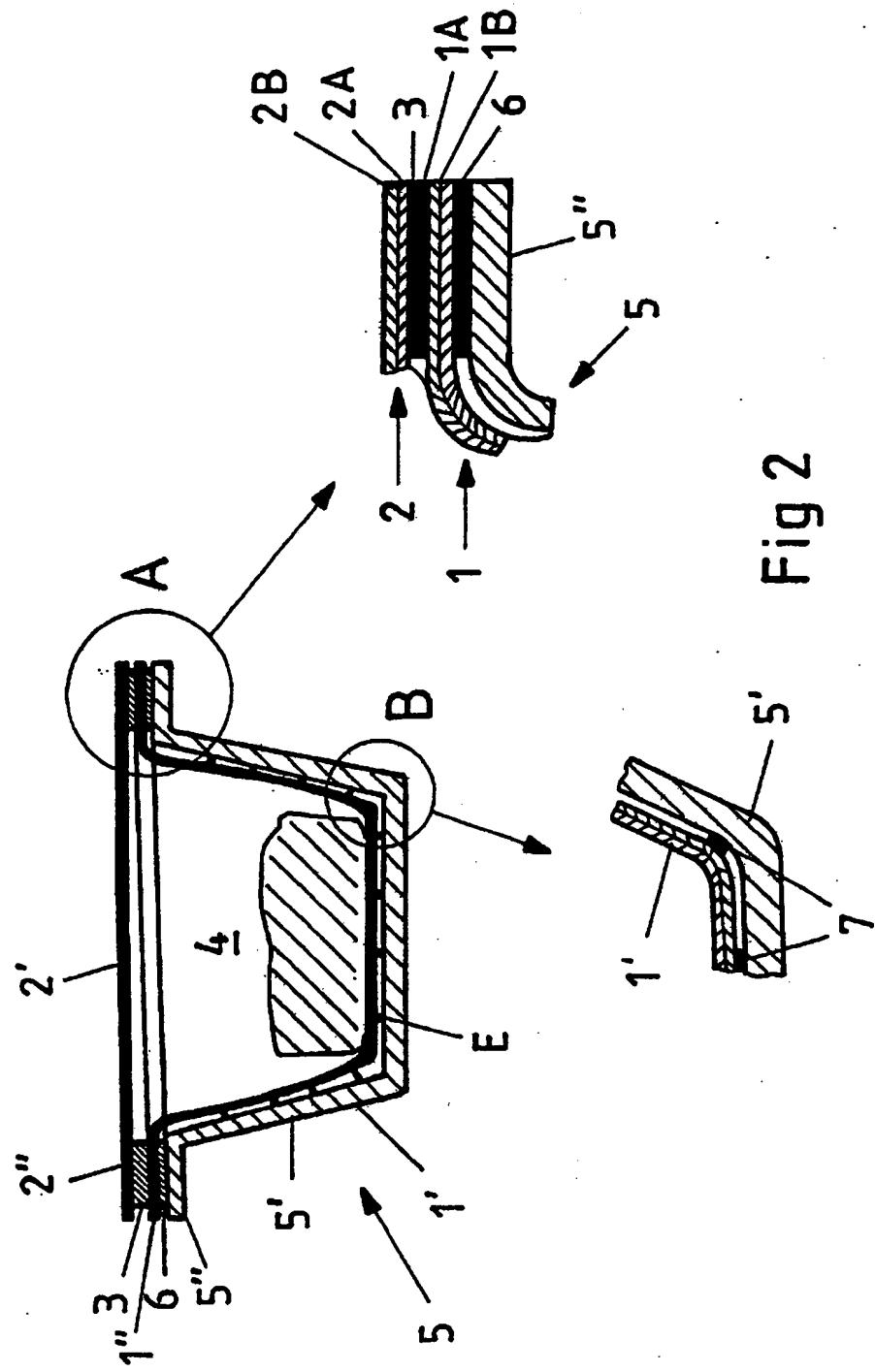


Fig 2

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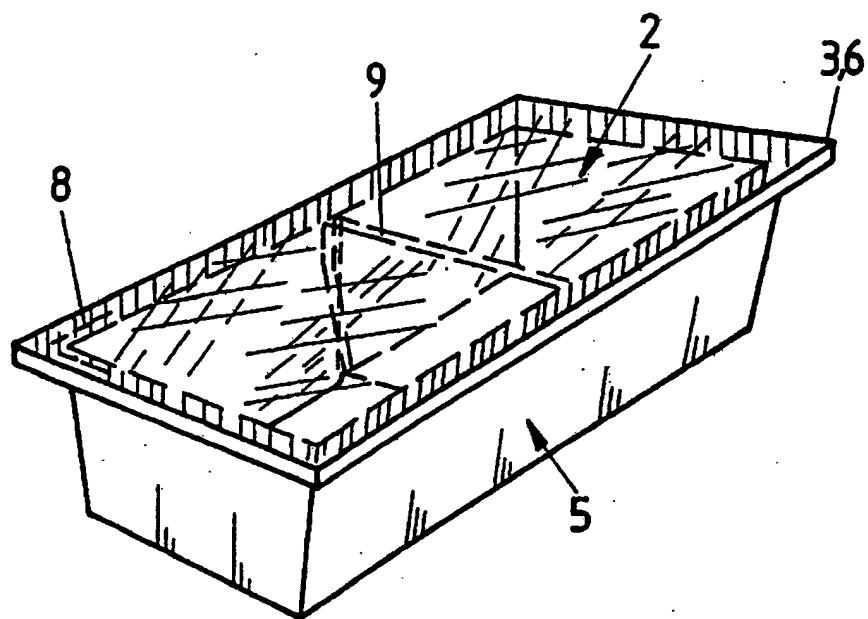


Fig 3

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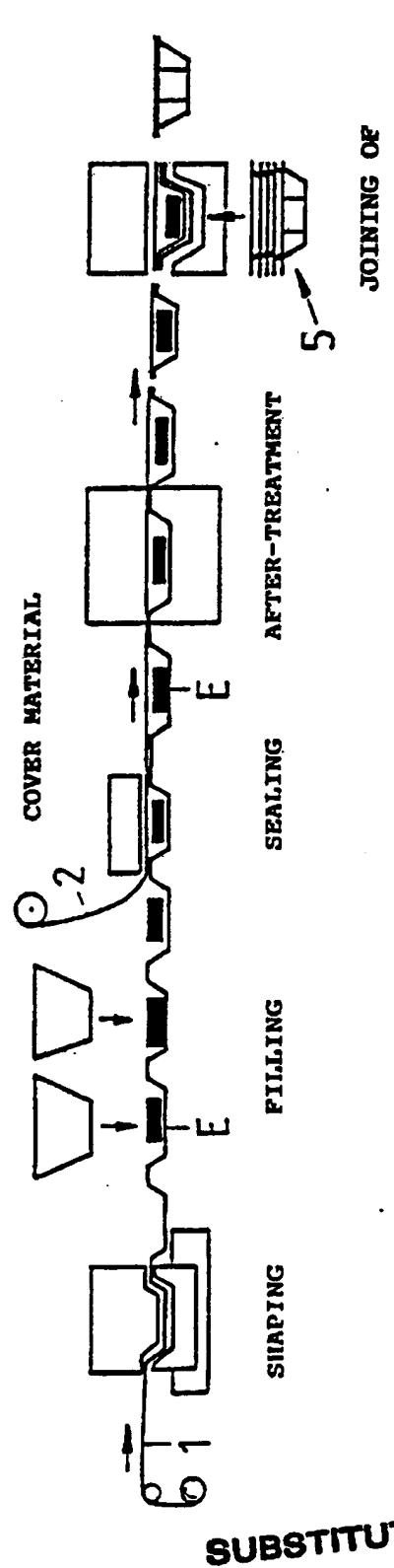


Fig 4

INTERNATIONAL SEARCH REPORT

International Application No PCT/FI88/00041

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) *								
According to International Patent Classification (IPC) or to both National Classification and IPC 4								
B 65 B 9/04								
II. FIELDS SEARCHED								
Minimum Documentation Searched †								
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; padding: 2px;">Classification System</th> <th style="text-align: center; padding: 2px;">Classification Symbols</th> </tr> </thead> <tbody> <tr> <td style="padding: 2px;">IPC 4</td> <td style="text-align: center; padding: 2px;">B 65 B 3/00, /02, 9/00- /04, 11/00, /48- /50; B 65 D 81/34</td> </tr> <tr> <td style="padding: 2px;">US C1</td> <td style="text-align: center; padding: 2px;">53:27, 141, 170-174, 428, 433, 449, 558-564</td> </tr> </tbody> </table>			Classification System	Classification Symbols	IPC 4	B 65 B 3/00, /02, 9/00- /04, 11/00, /48- /50; B 65 D 81/34	US C1	53:27, 141, 170-174, 428, 433, 449, 558-564
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<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center; padding: 2px;">Documentation Searched other than Minimum Documentation to the Extent that such Documents are included in the Fields Searched §</th> </tr> </thead> <tbody> <tr> <td colspan="2" style="text-align: center; padding: 2px;">SE, NO, DK, FI classes as above</td> </tr> </tbody> </table>			Documentation Searched other than Minimum Documentation to the Extent that such Documents are included in the Fields Searched §		SE, NO, DK, FI classes as above			
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SE, NO, DK, FI classes as above								
III. DOCUMENTS CONSIDERED TO BE RELEVANT*								
Category *	Citation of Document, ** with indication, where appropriate, of the relevant passages ††	Relevant to Claim No. ††						
X	EP, A, 0 196 799 (BUNZL FLEXPACK LIMITED ET AL) 8 October 1986 & JP, 61259905	1-3, 7						
X	DE, A, 2 211 659 (R MELZER OHG MASCHINENBAU UND METALLVERARBEITUNG) 20 September 1973	1, 7						
X	US, A, 3 938 730 (DETZEL ET AL) 17 February 1976 & NL, 7409853 FR, 2237815 BE, 817893 CH, 576902 AT, 338692 CA, 1022504 SE, 7409457	1, 3, 6						
A	WO, A1, 86/04880 (ARTUSI ALDO) 28 August 1986	1, 3, 6						
A	US, A, 2 438 089 (C M CARSON) 16 March 1948	1, 3, 6						
		.../...						
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IV. CERTIFICATION								
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report							
1988-06-23	1988 -06- 28							
International Searching Authority	Signature of Authorized Officer							
Swedish Patent Office	Allan Westrin							

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category	Description of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
A	GB, A, 1 548 482 (INST CUP INCORPORATED) 18 July 1976	1
A	GB, A, 1 184 483 (MAHAFFY & HARDER ENGINEERING COMPANY) 18 March 1970	

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